

REMARKS/ARGUMENTS

Claims' status

Claims 1-28 remain in this application. Claims 1-12 (Group I) are being prosecuted. Claims 1 and 2 have been amended. Claims 13-28 have been previously withdrawn as a result of an earlier restriction requirement. Applicant retains the right to present claims 13-28 in a divisional application.

Claim Rejections

Claims 1 and 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent 6,428,920 (Badding).

Claim 1 specifies " homogeneously non-porous body having one side with a relatively smooth surface and another side with a more textured surface with arrayed multiple indentations therein, wherein the thickest part of said non-porous body is at least 0.5 micrometers greater than the thinnest part of said electrolyte sheet" and wherein "one side of said electrolyte sheet experiencing a predominately compressive force, the other side of said electrolyte sheet experiencing a predominately tensile force, wherein the side with a relatively smooth surface is subjected to the predominately tensile force and more textured surface subjected to predominately compressive force".

That is, Applicants claimed a (1) homogeneously non-porous electrolyte body with (2) either (i) a more textured surface with arrayed multiple indentations therein.

Thus, the Badding reference does not disclose an electrolyte sheet with a substantially homogeneously nonporous body of varied thickness. Nor does it disclose a more textured surface with arrayed multiple indentations therein.

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The Badding '920 reference discloses roughened layers- i. e., layers with random variation in thickness. In contrast it was Applicants who figured that an arrayed or a predetermined pattern on the electrolyte surface provides certain advantageous not discussed by the reference. One of such advantages is better stress relief through better flexing of the electrolyte sheet, better stress relief, smaller overall average thickness and better strength from provided by the features 25.

Finally, page 7, lines 11-13 of the Badding reference '920 does not disclose a which side of the electrolyte body (i.e the smother side or the less smooth side) faces air and which side faces the fuel. Badding also does not discuss or teach which side of the electrolyte sheet is experiencing a predominately compressive force and which side is "experiencing a predominately tensile force", as called by applicant's claims. Column 7 (Ins. 11-13) of the Badding reference merely states "it is believed that the rough and/or porous nature of the interface allows more contact points for...electrodes to be bound to and to inject oxygen ions into the electrolyte."

The Examiner stated "as pointed out in applicant's specification, it is known to have a higher flow of air across the cathode, creating greater compressive force on the high pressure side (air side) and greater tensile force on the fuel side. So it is inherent that the fuel cell, taught by Badding, has a predominately compressive force on the air side and tensile force on the fuel side." Applicants respectfully disagree. The Badding '920 reference is silent with respect of electrolyte sheet orientation and does not disclose which surface of the electrolyte faces which environment. Thus, Badding does not disclose all of the claim elements called for in claim 1.

It was applicants that recognised that when there "if the electrolyte sheet has one textured and one relatively smooth surface that it is preferable for the electrolyte sheet to be oriented in a manner such that the textured surface experiences predominately compressive forces". (See paragraph [00104]). It is Applicant's teaching, and the use of

hindsight based on Applicant's own teaching is impermissible when evaluating either novelty or the obviousness of the Applicant's invention.

Accordingly, Claims 1 is not anticipated by US Patent 6,428,920 (Badding). Claims 3-12 depend from claim 1 as their base claim and therefore expressly incorporate the features of claim 1. Therefore, claims 1 and 3-12 are also not anticipated by US Patent 6,428,920 (Badding).

Claim 2 is an independent claim. Claim 2 is similar to claim 1. It calls for homogeneously non-porous body but specifies that "one side with a relatively smooth surface and another side with a more textured surface with a predetermined pattern of multiple indentations therein....wherein said relatively smooth side is the fuel facing side and said more textured side is the air-facing side." That is, Applicants claimed a (1) homogeneously non-porous electrolyte body with (a more textured surface with a predetermined pattern of multiple indentations.

Thus, the Badding reference does not disclose an electrolyte sheet with a substantially homogeneously nonporous body of varied thickness. Nor does it disclose a more textured surface with a predetermined pattern of multiple indentations therein.

Accordingly, Claim 2 is also not anticipated by US Patent 6,428,920 (Badding).

Claims 1 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0165732 A1 (McElroy) in view of US Publication 2001/0044043 (Badding) and evidenced by US Patent 4,874,678 (Reichner).

As discussed above, applicants called for the electrolyte having a homogeneously non-porous body. None of the cited references show a homogeneously non-porous electrolyte body that includes at least one textured surface. Thus, absent the teaching or suggestion, in the cited references themselves, that it is the electrolyte has a

substantially homogeneously non porous body with a textured surface, applicant's invention is unobvious over the cited art.

Furthermore, it was Applicants who realised, and taught, in the present application, that in certain configurations the fuel cell device may have a predominately compressive force on the air side and tensile force on the fuel side, and then taught a solution to this problem. That is, it was applicants that suggested "if the electrolyte sheet has one textured and one relatively smooth surface, it is preferable for the electrolyte sheet to be oriented in a manner such that the textured surface experiences predominately compressive forces". (See paragraph [00104]). None of the reference discusses the problem of having a predominately compressive force on the air side and tensile force on the fuel side, or the solution to the problem. Furthermore, none of the cited reference discloses which way to orient the electrolyte sheet if the electrolyte were to have one surface that is more textured than the other surface surface.

Claims 3-12 depend from claim 1 as their base claim and therefore expressly incorporate the features of claim 1. Therefore, claims 1 and 3-12 are not unpatentable over US Publication 2003/0165732 A1 (McElroy) in view of US Publication 2001/0044043 (Badding) and evidenced by US Patent 4,874,678 (Reichner).

As stated above, Claim 2 is similar to claim 1. It calls for homogeneously non-porous body but specifies that "one side with a relatively smooth surface and another side with a more textured surface with a predetermined pattern of multiple indentations therein....wherein said relatively smooth side is the fuel facing side and said more textured side is the air-facing side." These features are not disclosed by the combination of the cited references. Therefore, claim 2 is not unpatentable over US Publication 2003/0165732 A1 (McElroy) in view of US Publication 2001/0044043 (Badding) and evidenced by US Patent 4,874,678 (Reichner).

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Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy, Badding and Reichner as applied to claim 1 above, and further in view of US Patent 6,045,935 (Ketcham).

Contrary to the Examiner's assertion, the Ketcham reference does not teach that the electrolyte is thicker in the middle and thinner at the edges. Altough the disclosed electrolyte sheet is bent, but its thickness is constant. The Ketcham reference does not teach, disclose or suggest that the electrolyte is thicker in the middle and thinner at the edges. The oval or elliptical shape refers to the outline of the sheet and the way it is bent. (See Fig. 2, for example). Accordingly, Claim 3 is not unpatentable over McElroy, Badding and Reichner as applied to claim 1 above, and further in view of US Patent 6,045,935 (Ketcham).

Conclusion

Based upon the above amendments, remarks, and papers of records, applicant believes the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Applicant believes that no extension of time is necessary to make this Reply timely. Should applicant be in error, applicant respectfully requests that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Svetlana Z. Short at 607-974-0412.

Respectfully submitted,

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